WHAT IS CLAIMED IS:

1. A method for recording digital data codes representative of pieces of data information and asynchronously produced at irregular intervals in an information storage medium, comprising the steps of:

a) supplementing synchronous data codes representative of meaninglessness from the aspect of definitions of said pieces of data information in said irregular intervals among said digital data codes for producing a data stream;

b) converting said digital data codes and said synchronous data codes to an analog data signal storing said pieces of data information and said meaninglessness through a differential phase shift keying, and

c) recording said pieces of data information and said meaninglessness in an information storage medium.

2. The method as set forth in claim 1, in which said step a) includes the sub-steps of

a-1) checking said digital data codes to see whether or not any one of said digital data codes is identical in bit string with each synchronous data code,

a-2) changing the bit string of said any one of said digital data codes to another bit string different from the bit string of said synchronous data codes and the bit strings of others of said digital data codes representative of pieces of data information different from the piece of data information represented by said any one of said data information when the answer at said sub-step a-1) is given affirmative,

a-3) unchanging the bit string of said any one of said digital data codes without execution of said sub-step a-2) when the answer at said sub-step a-1) is given negative,

a-4) repeating said sub-steps a-2) and a-3) for said others of said digital data codes, and

a-5) inserting said synchronous data codes in said irregular intervals among said digital data codes.

3. The method as set forth in claim 1, in which said step b) includes the sub-steps of

b-1) converting said digital data codes and said synchronous data codes to gray codes representative of relative phases,

b-2) producing angular data codes representative of absolute values from said gray codes, and

b-3) converting said angular data codes to said analog data code through a quadrature modulation.

4. The method as set forth in claim 3, in which said gray codes are accumulated so as to produce said angular data codes in said sub-step b-2).

5. The method as set forth in claim 1, in which said step c) includes the sub-steps of

c-1) converting said analog data signal to a digital data signal through a pulse code modulation, and

c-2) driving a recording head for writing said digital data signal in said information storage medium.

6. The method as set forth in claim 1, in which said digital data codes are broken down into sets of digital data codes representative of a performance of a tune on a musical instrument.

7. The method as set forth in claim 6, in which said sets of digital data codes are representative of messages defined in the MIDI (Musical Instrument Digital Interface) standards.

8. The method as set forth in claim 7, in which each of said digital data codes and each of said synchronous data codes have a data length equal to 4 bits, and sixteen relative angular positions are selectively assigned to said digital data codes and said synchronous data codes before a modulation to said analog data signal in said step b).

9. The method as set forth in claim 8, in which said modulation is a quadrature modulation.

10. The method as set forth in claim 8, in which the relative angular position assigned to said synchronous data codes are different from zero.

11. A recording apparatus for recording digital data codes representative of pieces of data information and asynchronously produced at irregular intervals in an information storage medium, comprising:

a data converting unit supplied with said digital data codes, and supplementing synchronous data codes representative of meaninglessness from the aspect of definitions of said pieces of data information into said irregular intervals among said digital data codes for producing a data stream; and

a signal modulation unit connected to said data converting unit, and producing an analog data signal representative of said pieces of data information and said meaninglessness from said data stream through a differential phase shift keying.

12. The recording apparatus as set forth in claim 11, in which said data converting unit includes

a table for storing a relation between bit strings of certain digital data codes selected from said digital data codes and alternative bit strings different from a bit string of said synchronous data codes and bit strings of the others of said digital data codes,

a first data converter connected to said table and changing said certain digital data codes from said bit strings to said alternative bit strings and passing said others of said digital data codes without any change of bit string, and

a second data converter connected to said first data converter and inserting said synchronous data codes into said irregular intervals for producing said data stream.

13. The recording apparatus as set forth in claim 11, in which said signal modulation unit includes

a digital code-to-absolute phase converter connected to said data converting unit and producing angular data codes representative of absolute phases, and

a modulator connected to said digital code-to-absolute phase converter and producing said analog data signal through a quadrature modulation technique.

14. The recording apparatus as set forth in claim 13, in which said digital code-to-absolute phase converter includes

a data converter connected to said data converting unit and converting said digital data codes and said synchronous data codes to gray codes representative of relative phases, and

an accumulator connected to said data converter and accumulating said gray codes for producing said angular data codes.

15. The recording apparatus as set forth in claim 14, in which said data converter assigns one of said relative phases different from zero to said synchronous data codes.

16. The recording apparatus as set forth in claim 11, further comprising a write-in unit responsive to said analog data signal for recording said pieces of data information and said meaninglessness in an information storage medium.

17. The recording apparatus as set forth in claim 16, in which said write-in unit converts said analog data signal to a digital data signal, and drives a recording head for writing said pieces of data information and said meaninglessness in said information storage medium.

18. The recording apparatus as set forth in claim 17, in which said write-in unit converts said analog data signal to said digital data signal through a pulse code modulation.

19. The recording apparatus as set forth in claim 16, in which said data converting unit includes

a table for storing a relation between bit strings of certain digital data codes selected from said digital data codes and alternative bit strings different from a bit string of said synchronous data codes and bit strings of the others of said digital data codes,

a first data converter connected to said table and changing said certain digital data codes from said bit strings to said alternative bit strings and passing said others of said digital data codes without any change of bit string, and

a second data converter connected to said first data converter and inserting said synchronous data codes into said irregular intervals for producing said data stream.

20. The recording apparatus as set forth in claim 16, in which said signal modulation unit includes

a digital code-to-absolute phase converter connected to said data converting unit and producing angular data codes representative of absolute phases, and

a modulator connected to said digital code-to-absolute phase converter and producing said analog data signal through a quadrature modulation technique.

21. The recording apparatus as set forth in claim 20, in which said digital code-to-absolute phase converter includes

a data converter connected to said data converting unit and converting said digital data codes and said synchronous data codes to gray codes representative of relative phases, and

an accumulator connected to said data converter and accumulating said gray codes for producing said angular data codes.

22. The recording apparatus as set forth in claim 21, in which said data converter assigns one of said relative phases different from zero to said synchronous data codes.

23. The recording apparatus as set forth in claim 11, in which said digital data codes are broken down into sets of digital data codes representative of a performance of a tune on a musical instrument.

24. The recording apparatus as set forth in claim 23, in which said sets of digital data codes are representative of messages defined in the MIDI (Musical Instrument Digital Interface) standards.

25. The recording apparatus as set forth in claim 23, in which each of said digital data codes and each of said synchronous data codes have a data length equal to 4 bits, and said signal modulating unit selectively assigns sixteen rela-

tive angular positions to said digital data codes and said synchronous data codes before a modulation to said analog data signal.

26. The recording apparatus as set forth in claim 25, in which said modulation is a quadrature modulation.

27. The recording apparatus as set forth in claim 25, in which the relative angular position assigned to said synchronous data codes is different from zero.

28. An information storage medium having a plurality of recording channels partially used for recording pieces of data information represented by digital data codes asynchronously produced at irregular intervals and pieces of information representative of meaninglessness from the aspect of definitions of said pieces of data information and partially for other pieces of data information represented by a data signal.

29. The information storage medium as set forth in claim 28, in which said pieces of data information, said pieces of information and said other pieces of data information are opto-magnetically recorded in said plurality of recording channels.

30. A method for reproducing digital codes at irregular intervals from pieces of data information and pieces of meaningless information stored in an information storage medium, comprising the steps of:

a) producing an analog data signal from said pieces of data information and said pieces of meaningless information stored in said information storage medium;

b) converting said analog data signal to a data stream containing said digital codes and synchronous data codes representative of said pieces of meaningless information; and

c) eliminating said synchronous data codes from said data stream so as to leaving said digital data codes representative of said pieces of data information at said irregular intervals.

31. The method as set forth in claim 30, in which said step b) includes the sub-steps of

b-1) producing first signals representative of a series of coordinates in a quadrature coordinate system from said analog data signal,

b-2) converting said series of coordinates in said quadrature coordinate system to a series of coordinates in a polar coordinate system so as to produce second signals from said first signals, and

b-3) reversely mapping said series of coordinates in said polar coordinate system to said digital data codes and said synchronous data codes for producing said data stream.

32. The method as set forth in claim 31, in which said series of coordinate system in said quadrature coordinate system are produced from said analog data signal through a synchronous detection.

33. The method as set forth in claim 30, in which said step c) includes the sub-steps of

c-1) checking said data stream to see whether or not one of said synchronous data codes reaches,

c-2) ignoring said one of said synchronous data codes when the answer in said step c-1) is given affirmative,

c-3) checking one of said digital data codes to see whether or not the bit string has been changed to an alternate bit string without execution of said sub-step c-2) when said answer is given negative,

c-4) restoring said bit string from said alternate bit string when the answer in said step c-3) is given affirmative, and

c-5) passing said one of said digital data codes without execution of said sub-step c-4) when said answer in said sub-step c-3) is given negative.

34. A playback apparatus for producing digital data codes at irregular intervals from pieces of data information and pieces of meaningless information stored in an information storage medium, comprising:

a signal demodulating unit supplied with an analog data signal carrying said pieces of data information and said pieces of meaningless information, and producing a data stream containing said digital data codes and synchronous data codes representative of said pieces of meaningless information; and

a data converter connected to said signal demodulating unit, and eliminating said synchronous data codes from said data stream so as to leave said digital data codes representative of said pieces of data information at said irregular intervals.

35. The playback apparatus as set forth in claim 34, in which said signal demodulating unit includes

a carrier signal restoring circuit for extracting wave components of a carrier signal on which said pieces of data information and said pieces of meaningless information ride from said analog data signal,

a first data converter responsive to said wave components so as to produce data signals representative of a series of coordinates in a polar coordinate system from said analog data signal, and

a second data converter converting said data signals to said data stream through a reverse mapping.

36. The playback apparatus as set forth in claim 35, in which said carrier signal restoring circuit includes

a synchronous detector modulating said analog data signal for producing intermediate data signals representative of a series of coordinates in a quadrature coordinate system from said analog data signal,

a coordinate transformer connected to said synchronous detector and carrying out a coordinate transformation for producing one of said data signals representative of an error component contained in angles stored in the other of said data signals from said intermediate data signals, and

a phase-locked loop responsive to said one of said data signals for changing a frequency of said carrier signal.

37. The playback apparatus as set forth in claim 35, in which said first data converter includes

a synchronous detector modulating said analog data signal for producing intermediate data signals representative of a series of coordinates in a quadrature coordinate system from said analog data signal, and

a coordinate transformer connected to said synchronous detector and carrying out a coordinate transformation for producing one of said data signals representative angles in said polar coordinate system.

38. A method for recording digital data codes representative of pieces of music data information and asynchronously produced at irregular intervals in an information storage medium, said digital data codes having a format capable of representing more than two values, comprising the steps of:

a) converting digital data codes to an analog signal through a modulation technique assigning values of said digital data codes to values of a physical quantity periodically varied;

b) recording said pieces of music data information stored in said analog signal into an information storage medium.

39. The method as set forth in claim 38, in which said step a) includes the sub-steps of

a-1) supplementing synchronous data codes representative of meaninglessness from the aspect of definitions of said pieces of data information in said irregular intervals for producing a data stream, and

a-2) converting said digital data codes and said synchronous data codes to said analog data signal storing said pieces of data information and said meaninglessness.

40. The method as set forth in claim 38, in which said modulation technique is a differential phase shift keying.

41. A recording apparatus for recording digital data codes representative of pieces of music data information and asynchronously produced at irregular intervals in an information storage medium, each of said digital data codes having a format capable of representing more than two values, comprising:

an analog audio signal producing circuit supplied with said digital data codes, and producing an analog audio signal storing said pieces of music data information through a modulating technique assigning values of said digital data codes to values of a physical quantity periodically varied; and

a recording circuit connected to said analog audio signal producing circuit, and storing said pieces of music data information stored in said analog audio signal in an information storage medium.

42. The recording apparatus as set forth in claim 41, in which said analog audio signal producing circuit includes

a data converting unit supplied with said digital data codes and supplementing synchronous data codes representative of meaninglessness from the aspect of definitions of said pieces of data information into said irregular intervals among said digital data codes for producing a data stream, and

a signal modulation unit connected to said data converting unit and producing an analog data signal representative of said pieces of data information and said meaninglessness from said data stream through said modulation technique.

43. The recording apparatus as set forth in claim 42, in which said modulation technique is a differential phase shift keying.